IN THE CLAIMS

1. (original) A method for performing medical imaging, the method comprising:

imaging a patient utilizing a computed tomography imaging modality, the patient between a pencil-beam x-ray source and an x-ray detector; and

imaging the patient between the pencil-beam x-ray source and the x-ray detector using a nuclear medicine imaging modality.

2. (original) A method in accordance with Claim 1 wherein imaging the patient utilizing a nuclear medicine imaging modality and imaging the patient utilizing a computed tomography imaging modality are performed simultaneously.

3. (original) A method in accordance with Claim 1 wherein imaging the patient utilizing a nuclear medicine imaging modality and imaging the patient utilizing a computed tomography imaging modality are performed sequentially.

4. (currently amended) A method in accordance with Claim 1 wherein imaging a patient utilizing a computed tomography imaging modality comprises translating at least one of the x-ray detector and the pencil-beam x-ray source laterally during a portion of a computed tomography scan.

5. (currently amended) A method in accordance with Claim 1 wherein imaging a patient utilizing a computed tomography imaging modality comprises translating at least one of the x-ray detector and the pencil-beam x-ray source along an arcuate path during a portion of a computed tomography scan.

6. (currently amended) A method in accordance with Claim 1 wherein imaging a patient utilizing a computed tomography imaging modality comprises translating the x-ray detector and the pencil-beam x-ray source during a portion of a computed tomography scan.

7. (original) A method in accordance with Claim 1 wherein imaging a patient utilizing a computed tomography imaging modality comprises maintaining a gantry, supporting the pencil-beam x-ray source and the x-ray detector, substantially stationary in at least one viewing position while translating at least one of the pencil-beam x-ray source and the x-ray detector from a first imaging position to a second imaging position.

8. (original) A method in accordance with Claim 1 wherein imaging a patient utilizing a computed tomography imaging modality comprises directing a pencil-beam of x-rays at a plurality of predetermined angles with respect to the pencil-beam x-ray source during a portion of a computed tomography scan.

9. (original) A method in accordance with Claim 1 wherein imaging a patient utilizing a computed tomography imaging modality comprises directing a pencil-beam of x-rays at a substantially fixed angle with respect to the pencil-beam x-ray source during a portion of a computed tomography scan.

10. (original) A method in accordance with Claim 1 further comprising rotating the pencil-beam x-ray source and x-ray detector around a longitudinal axis of a viewing area and within a predetermined angle.

11. (original) A method in accordance with Claim 10 wherein the nuclear medicine imaging modality includes an emission radiation detector, said method further comprising corotating the emission radiation detector around the longitudinal axis of the viewing area with the pencil-beam x-ray source and x-ray detector.

12. (original) A method in accordance with Claim 10 wherein the nuclear medicine imaging modality includes an emission radiation detector, said method further comprising rotating the emission radiation detector around the longitudinal axis of the viewing area separately from the pencil-beam x-ray source and x-ray detector.

13. (original) A method in accordance with Claim 1 wherein imaging the patient utilizing a nuclear medicine imaging modality comprises imaging the patient using at least one of single positron emission computed tomography (SPECT) and positron emission tomography (PET).

14. (original) A method for multi-modality imaging comprising:

scanning an area using a computed tomography imaging modality, the area between a pencil-beam x-ray source and an x-ray detector; and

scanning the area using a nuclear medicine imaging modality.

15. (original) A method for multi-modality imaging in accordance with Claim 14 wherein scanning an area using a computed tomography imaging modality comprises maintaining a gantry, supporting the pencil-beam x-ray source and the x-ray detector, substantially stationary in at least one viewing position while translating at least one of the pencil-beam x-ray source and the x-ray detector from a first imaging position to a second imaging position.

16. (original) A multi-modality computed tomography system, comprising:

a gantry, rotatable about a viewing area;

a x-ray source coupled to said gantry that provides a pencil-beam of x-rays, said x-ray source configured to direct at least a portion of the pencil-beam of x-rays into said viewing area;

a detector that is responsive to said pencil-beam of x-rays and that is configured to receive at least a portion of said x-rays during a x-ray computed tomography portion of a scan; and

at least one gamma camera configured to receive gamma photons emitted in said viewing area.

17. (original) A multi-modality computed tomography system in accordance with Claim 16 wherein said gantry is configured to maintain a stationary position, while at least one of said pencil-beam x-ray source and said x-ray detector are translated from a first imaging position to a second imaging position.

18. (original) A multi-modality computed tomography system in accordance with Claim 16 further comprising a second gantry positioned substantially parallel to said gantry and axially spaced from said gantry, said second gantry configured to rotate said at least one gamma camera about the viewing axis.

19. (original) A multi-modality computed tomography system in accordance with Claim 16 further comprising a second gamma camera positioned to receive coincident gamma photons emitted in said viewing area.

20. (original) A multi-modality computed tomography system in accordance with Claim 16 wherein said x-ray source provides a pencil-beam of x-rays at a plurality of angles with respect to said pencil-beam detector.

21. (original) A multi-modality computed tomography system in accordance with Claim 16 wherein said x-ray source provides a pencil-beam of x-rays at a substantially fixed angle with respect to said pencil-beam detector.

22. (original) A multi-modality computed tomography system in accordance with Claim 16 further comprising a translational mechanism coupled to said gantry, said translational mechanism configured move at least one of said x-ray source and said x-ray detector from a first position to a second position with respect to said gantry.

23. (original) A multi-modality computed tomography system in accordance with Claim 16 further comprising a translational mechanism associated with each of said x-ray source and said x-ray detector, each of said translational mechanisms coupled to said gantry, each of said translational mechanisms configured to move at least one of said x-ray source and said x-ray detector from a first position to a second position with respect to said gantry.

24. (original) A multi-modality computed tomography system in accordance with Claim 16 further comprising a translational mechanism associated with each of said x-ray source and said x-ray detector, each of said translational mechanisms coupled to said gantry, each of said translational mechanisms configured to move said x-ray source and said x-ray detector co-axially from a first position to a second position with respect to said gantry.

25. (original) A multi-modality computed tomography system in accordance with Claim 16 wherein said detector comprises a linear array of detector elements, said x-ray source configured to sweep a pencil-beam of x-rays in relation to said detector.

26. (original) A multi-modality computed tomography system, comprising:

a gantry, rotatable around a substantially rectangular viewing area;

a x-ray source coupled to said gantry that provides a pencil-beam of x-rays, said x-ray source configured to direct at least a portion of the pencil-beam of x-rays into said viewing area, said x-ray source positioned adjacent a first side of the viewing area;

a detector that is responsive to said pencil-beam of x-rays and that is configured to receive at least a portion of said x-rays during a x-ray computed tomography portion of a scan, said detector positioned on a second side of the viewing area opposite said first side; and

a gamma camera configured to receive gamma photons emitted in said viewing area, said gamma camera positioned on at least one of a third side of the viewing area and a fourth side of the viewing area wherein the third and the fourth sides are each positioned between the first and second sides in an opposing arrangement.

27. (original) A multi-modality computed tomography system in accordance with Claim 26 wherein said gantry is configured to maintain a stationary

position, while at least one of said pencil-beam x-ray source and said x-ray detector are translated from a first imaging position to a second imaging position.

28. (original) A multi-modality computed tomography system in accordance with Claim 26 wherein said x-ray source is configured to transmit a pencil-beam of x-rays at a substantially fixed angle with respect to the detector.

29. (original) A multi-modality computed tomography system in accordance with Claim 26 wherein said x-ray source is configured to sweep a pencil-beam of x-rays at a plurality of predetermined angles with respect to the detector.

30. (original) A multi-modality computed tomography system in accordance with Claim 26 wherein said x-ray detector is a linear array of detector elements configured to receive a beam of attenuated radiation from said x-ray source.

31. (original) A multi-modality imaging system comprising:

a pencil-beam x-ray computed tomography (CT) portion; and

a nuclear medicine imaging portion.

32. (original) A multi-modality imaging system in accordance with Claim 31 further comprising a gantry supporting a pencil-beam x-ray source and a x-ray detector, said gantry configured to maintain a stationary position, while at least one of said pencil-beam x-ray source and said x-ray detector are translated from a first imaging position to a second imaging position.

33. (original) A multi-modality imaging system in accordance with Claim 31 further comprising:

a first gantry supporting said pencil-beam x-ray CT portion; and

a second gantry supporting said nuclear medicine imaging portion, said second gantry positioned substantially parallel to said first gantry, said second gantry axially spaced from said first gantry.

34. (original) A multi-modality imaging system in accordance with Claim 31 wherein said pencil-beam x-ray (CT) portion and said nuclear medicine imaging portion cooperate to perform a scan of a viewing area using a rotatable gantry.

35. (original) A multi-modality imaging system in accordance with Claim 31 wherein said pencil-beam x-ray (CT) portion and said nuclear medicine imaging portion are configured to perform a pencil-beam x-ray (CT) scan and a nuclear medicine imaging scan sequentially.

36. (original) A multi-modality imaging system in accordance with Claim 31 wherein said pencil-beam x-ray (CT) portion and said nuclear medicine imaging portion are configured to perform a pencil-beam x-ray (CT) scan and a nuclear medicine imaging scan simultaneously.

37. (original) A multi-modality imaging system in accordance with Claim 31 wherein said pencil-beam x-ray (CT) portion and said nuclear medicine imaging portion are configured to perform a scan alternating between at least a portion of a pencil-beam x-ray (CT) scan and at least a portion of a nuclear medicine imaging scan.

38. (original) A multi-modality imaging system in accordance with Claim 31 wherein said nuclear medicine imaging portion comprises at least one of a gamma camera, a positron emission tomography (PET) imaging system, and a single positron emission tomography (SPECT) system.